RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 51-07-18

Log Event A

Borehole Information

Farm : TX	**Tank :** TX-107	**Site Number :** 299-W15-195
N-Coord : 41,708	**W-Coord :** 75,956	**TOC Elevation :** 670.00
Water Level, ft : 83.90	**Date Drilled :** 7/31/1977	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
According to the driller's records, this borehole was not perforated but grout was added. The driller's record shows an 8-in. starter casing was installed to a depth of 9 ft. Fifteen gal of grout was added to the annulus after the 8-in. casing was pulled, and 12.5 gal of grout was added to the bottom 5 ft of the borehole.

Water was found inside the bottom 16 ft of the borehole.

The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 4/19/1996	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 28.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 4/22/1996	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 97.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 27.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Borehole 51-07-18

Log Event A

Analysis Information

Analyst : S.D. Barry

Data Processing Reference : P-GJPO-1787 Analysis Date : 10/10/1996

Analysis Notes :

This borehole was logged with the SGLS in two logging runs. The pre-survey field verification spectra from both log runs did not pass the acceptance criteria established for the peak shape and system efficiency. A nonconformance report issued in August 1996 (N-96-05) identified this failure as a power supply malfunction that resulted in a low detector bias voltage supplied to the logging tool. This malfunction occurred during the mornings because of inadequate system warm-up time. This report also documents that concentrations calculated from data collected in the first 2 hours of logging could be systematically underestimated by about 10 percent. Therefore, the data from log runs 1 and 2 (total depth of the borehlole) may show a repeatability problem upon relogging of the borehole in the future.

The post-survey field verification spectra for both log runs passed the acceptance criteria for the peak shape and system efficiency, providing evidence the logging system was operating appropriately after an initial warm-up time. Corrections for gain drifts during data collection were not necessary during processing of the data to maintain proper peak identification. The energy calibration and peak-shape calibration from verification spectra that successfully met the established acceptance criteria were used to establish the channel-to-energy parameters for processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The man-made radionuclides Cs-137, Co-60, and Eu-154 were identified in this borehole. The presence of Cs-137 was measured almost continuously from the ground surface to about 16.5 ft and intermittently to the bottom of the borehole. The maximum Cs-137 concentration was about 6.5 pCi/g at 4 ft. Co-60 was measured continuously from 74 to 49.5 ft with a maximum concentration of 179 pCi/g at 59 ft. Eu-154 was measured almost continuously from 60 to 49 ft with a maximum concentration of 609 pCi/g at 52 ft.

A time-sequence plot from October 1982 to June 1994 was created from historical gross gamma log data. Analysis of the data shows a spike of increasing contamination from January 1989 to January 1990 at 53 ft. This peak begins to steadily decrease sometime after early 1990.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank TX-107.

Log Plot Notes:

Separate log plots show the man-made (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made, the natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

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Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A time-sequence plot from October 1982 to June 1994 was created from historical gross gamma log data and is provided with the spectral gamma log data.